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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,146	12/23/2003	Hitoshi Matsuoka	1691-0195P	7474
2292 7590 01/30/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER DOVE, TRACY MAE				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/743,146

Applicant(s)

MATSUOKA ET AL.

Examiner

TRACY DOVE

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-22 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the communication filed on 10/23/08. Applicant's arguments have been considered, but are not persuasive. Claims 1 and 3-22 are pending. Claims 3 and 4 are withdrawn. This Action is Non-FINAL.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/23/08 has been entered.

Applicant requested nonelected Group II be rejoined with Group I. Group II will be considered for rejoinder only if all claims in elected Group I are directed toward allowable subject matter.

Claim Objections

Claim 21 is objected to because of the following informalities: "wherein the ion exchange resins are produced..." should recite "wherein the crosslinked ion exchange resins are produced..." to provide proper antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5-14 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fenton et al., US 6,465,136.

Fenton teaches a composite membrane structure comprising a composite membrane and at least one protective layer disposed adjacent to the composite membrane. The composite membrane is a porous polymeric matrix (porous film) and an ionically conductive solid, noble metal or combination thereof dispersed within the matrix, and preferably, a binder. The binder is an ion exchange polymer. The protective layer comprises binder and ionically conductive solid, hygroscopic fine powder or a combination thereof (abstract). The porous polymeric matrix possesses high porosity and extremely fine pore size. Preferably the matrix has pores possessing a maximum dimension in the range from about 0.025 μm to about 1 μm . (4:66-5:13). The ionically conductive solid and binder are impregnated into the porous polymeric matrix in order to render the interior volume of the membrane occlusive (33-39). The binder is preferably present in the composite membrane and is any chemically and electrochemically stable ion exchange resin or other polymer with high ionic conductivity (6:19-29). The protective layer comprises a binder and hygroscopic fine powder. The fine powders may be silica or titania and have an average particle size less than about 10 μm (6:61-67). The binder employed in the protective layer may be the same as that employed in the composite membrane (6:40-60). The matrix has porosity in the range of 40-95%, more preferably 60-90% (5:14-20). The matrix has a thickness of 6-102 μm

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(4:55-65). The binder and ionically conductive solid employed in the protective layer are the same types of materials as those dispersed within the composite membrane (continuous phase) (6:50-54). Noble metals (inorganic filler) can be used in addition to the ionically conductive solid in the composite membrane (6:7-18). Crosslinkable ion exchange materials are described at column 6, lines 25-29 that include Nafion, polystyrene sulfonic acid, perfluorinated carboxylic acid resins and other polymetric acid resins which form polymers. Both styrene sulfonic acid (the monomer) and polystyrene sulfonic acid (polymer) are polyfunctional, but for different reasons: the monomer is difunctional (the vinyl group that takes part in the polymerization and the sulfonic acid group) and the polymer is polyfunctional (one sulfonic acid group per monomer unit is the polymer-the vinyl groups being already reacted).

Regarding claim 1, the limitation "wherein the polyfunctional vinyl *monomer* is at least one selected from the group consisting of divinylbenzene, divinylsulfone, butadiene, chloroprene, divinylbisphenyl and trivinylbenzene" is considered a product-by-process limitation. Fenton discloses crosslinkable ion exchange materials at column 6, lines 25-29 that include polystyrene sulfonic acid, perfluorinated carboxylic acid resins and other polymetric acid resins which form polymers. The monomer used to form the crosslinked ion exchange resin of claim 1 is not given patentable weight unless it can be shown that the produced ion exchange resin cannot be obtained by the Fenton reference. The present specification does not appear to disclose any specific ion exchange resin materials. Note page 14 the present specification recites "the polymerizable monomer which is the raw material of an ion exchange resin refers to a

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polymerizable monomer which is used in the production of a *conventionally known* ion exchange resin and becomes an ion exchange resin by polymerization".

Fenton does not explicitly teach the inorganic filler is a lamellar in shape with the claimed aspect ratio.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because the courts have held that where the only difference between the prior art and the claimed invention was a recitation of relative dimensions (size or shape) of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. See MPEP 2144.04.

Regarding claims 10 and 11, one of skill would have known that the composite membrane with protective layer of Fenton and the ion exchange membrane of the claimed invention would have had similar properties. //

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fenton et al., US 6,465,136 in view of Roark et al., US 7,001,446.

See discussion of Fenton above regarding claim 1. Fenton does not explicitly teach the fine particles are selected from the materials of pending claim 15.

However, Roark teaches a protective layer is applied to a membrane to protect the catalyst from the detrimental effects of feedstream and other contaminants that may enter the membrane. Exemplary protective layers include alumina, zirconia and other metal oxides. A protective layer of porous perovskites can be used to protect the

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membrane from poisoning. In addition, a protective layer comprising a ceramic or other material that absorbs water or hydrocarbons can be provided (9:57-10:16).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the perovskite protective layer material of Roark for the protective layer of Fenton because Fenton teaches useful powders for the protective layer are those which are capable of absorbing water. The protective layer of Fenton decreased the amount of fuel crossover and the protective layer of Roark prevents the feedstream and contaminants from passing through to the membrane. Therefore, of one of skill would have been motivated to use the protective layer materials of Roark for the protective layer of Fenton to decrease fuel (feedstream) crossover.

Response to Arguments

Applicant's arguments filed 9/25/08 have been fully considered but they are not persuasive. Applicant argues Fenton fails to teach or suggest an ion exchange membrane produced from a crosslinkable monomer such as a polyfunctional vinyl compound wherein the polyfunctional vinyl monomer is at least one selected from the group consisting of divinylbenzene, divinylsulfone, butadiene, chloroprene, divinylbisphenyl and trivinylbenzene. However, this limitation is considered a product-by-process limitation. See discussion above. Fenton teaches crosslinkable ion exchange materials at column 6, lines 25-29.

Applicant submits that polystyrene sulfonic acid would not be considered a polyfunctional vinyl compound because the polystyrene does not have the vinyl group of

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the styrene monomer which is polymerized. However, at least claim 1 recites the monomer is a polyfunctional vinyl compound. Claim 1 does not require the produced polymer (ion exchange resin) to be a polyfunctional vinyl polymer. Therefore, this argument is not commensurate in scope with the presently claimed invention.

Applicant argues one skilled in the art would not be motivated to modify the porous layer of Fenton by using the materials disclosed by Roark for non-porous membranes. This argument is not found persuasive because the Examiner doesn't rely on substituting membranes, but relies on using the surface layer of Roark for the surface layer of Fenton. One of skill would have been motivated to use the perovskite protective layer material of Roark for the protective layer of Fenton because Fenton teaches useful powders for the protective layer are those which are capable of absorbing water. The protective layer of Fenton decreased the amount of fuel crossover and the protective layer of Roark prevents the feedstream and contaminants from passing through to the membrane. Therefore, one of skill would have been motivated to use the protective layer materials of Roark for the protective layer of Fenton to decrease fuel (feedstream) crossover. Applicant has not addressed the Examiner's motivation for combining the references.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 22, 2008

/Tracy Dove/

Primary Examiner, Art Unit 1795